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ABSTRACT

The formulation of the Energy Curriculum Institute by the University of Houston at Clear Lake City was based upon the idea that a new approach was needed to develop effective energy education programs. Institute staff assumed that education could no longer depend upon federal and state educational energy agencies for curricular or financial leadership for projects. A brief description of the institutes, including their funding, speakers and materials, instruction, grading system, and balanced perspective, serves as an example of a model for shared local resources which staff propose as the necessary new approach to energy programs. The model assumes that energy education programs: (1) depend upon teacher education programs; (2) require increased cooperation between universities, school districts, energy companies, government agencies, environmental groups, and others; and (3) will be funded increasingly by private local sources. The groups which provided significant support for the institutes through speakers, materials, and field trips are described. (DC)

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THE SHARED LOCAL RESOURCES ENERGY INSTITUTE MODEL

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A central theme of this paper is that a new approach is needed to develop effective energy education programs. The days of waiting for federal or state educational energy agencies to exert either curricular or financial leadership similar to the "big project" days of the 1960's is over. After briefly describing the UH-CLC Energy Curriculum Institute experiment, this paper will present a detailed description of the Shared Local Resources Model and provide examples of its application in energy education.

The UH-CLC Energy Curriculum Institute

At UH-CLC we have conducted Energy Curriculum Institutes for educators during the past four summers(1978-81). These institutes are intensive, full-day experiences lasting two weeks in which the participants are exposed to numerous speakers, films and learning activities that treat some aspect of energy. All 70 participants receive 3 hours of graduate credit.

The institutes are funded by the Shell Companies Foundation, Inc. In 1981 the educator participants received a stipend that paid for tuition, building use fees and parking fees($89.75).

Three characteristics that have contributed to the success of the institutes can be identified:

I. Primary Speakers and Materials.

Primary speakers and materials form the basis of the program. For example, rather than having a local government professor speak on the role of the United States in the global energy community, we have been

able to obtain a U.S.Department of State speaker who has been and is involved in representing the United States in several international energy projects.

In using primary speakers, it is important to identify people who are skilled communicators. Our experience has shown that teachers are not tolerant of technical experts who read long, uninteresting papers.

II. Focus on Instruction/Contract Grading.

Participants are required to complete a project in order to earn an A. The projects should help the participants infuse energy into their classrooms. Participants design their own project in consultation with one of the instructors. Examples of participant projects in 1981 include:

- Three energy learning centers developed by a team of four fifth grade teachers from one elementary school.
- An interest center on "energy mathematics" developed by a fifth grade math teacher. This center, which contains 18 separate activities, is being used by all four fifth grade teachers in a local school.
- An instructional unit on "energy careers" developed by an eighth grade CVAE teacher.
- An instructional unit on "Energy and Chemistry" developed by a chemistry teacher in the Houston ISD Vanguard(Magnet School) program.
- A detailed analysis ("term paper") on the controversial South Texas Nuclear Project and nuclear power in general.

Several participants were given extra time to complete their projects in order to qualify for an A grade. The final grades in 1981

consisted of 45 percent A and 54 percent B.

III. Comprehensive, Balanced Perspective

Great care is given to presenting a balanced perspective. A speaker from the nuclear industry is balanced by anti-nuclear literature and films. Participants are encouraged to ask controversial questions; speakers are expected to be candid and open.

Many energy topics are discussed. Topics for speakers and films have included: the annual government and industry econometric energy forecasts

solar powered satellites

nuclear power

geothermal energy

energy financing, domestic and global

OPEC

low technology solar systems: active and passive

Other topics are introduced on a timely basis. Topics vary from year to year depending on the availability of speakers.

The Shared Local Resources Model

The UH-CLC Energy Curriculum Institute Model, as it has evolved the past four years(1978-81), is based on three key assumptions:

- o Effective energy education depends on teacher education programs and the development of energy literate educators.
- o Effective energy education for teachers will be based increasingly on cooperative efforts between teacher educators(universities), school districts, energy companies and their associations, federal and state agencies, environmental groups and other interested individuals and organizations.

- Effective energy education will be funded increasingly by private sources rather than public agencies and these private sources will usually be local energy companies.

Based on these assumptions, significant support in the form of speakers, materials and field trips has been received by UH-CLC during 1981. The following groups have participated in the UH-CLC concept of the Shared Local Resources Model:

- NASA. The Johnson Space Center of the National Aeronautics and Space Administration(NASA) provided the Project Engineer from the Solar Power Satellite Program as a speaker along with multiple copies of pamphlets describing the several NASA energy related projects and programs. In addition, teachers were encouraged to bring their students to the Johnson Space Center facility for field trips.
- National Science Teachers Association. Approximately 22 of NSTA's Project for an Energy-Enriched Curriculum(PEEC) instructional modules were distributed to the participants. Instructional units at all grade levels in many content areas were available. These materials were described, demonstrated and analyzed by Professor Jones of the institute faculty; he is an author of two of the PEEC units: Appropriate Technology in Energy for Advanced Students, Grades 11-12 and Critical Thinking About Energy for General Science and Social Studies, Grades 10-12.
- Houston Lighting and Power Company. HL&P provided two speakers including their chief spokesman for nuclear power

and multiple copies of several booklets and pamphlets. In addition, HL&P provided a bus that took 32 participants on an all-day field trip to the South Texas Project nuclear generating site near Bay City, Texas. Following an extensive tour of the facility conducted by nuclear operators who are in training, HL&P provided lunch for the teachers on the return trip to the campus.

- American Museum of Science and Energy. The American Museum of Science and Energy at Oak Ridge, Tennessee in cooperation with Oak Ridge Associated Universities and the U.S. Department of Energy has developed a curriculum project, Science Activities in Energy, which consists of eight different units in separate folios. Multiple copies of each unit were provided for institute participants. These colorful and innovative materials, which were designed for upper elementary and middle school learners, are popular with institute participants.
- Armand Bayou Nature Center. During a visit to the nature center, the director gave an overview of energy flows in natural systems followed by a slide presentation about the nature center. After a presentation of the "Dance of Life"--an environmental play using the teacher participants as "actors", the teachers were free to browse through the exhibits, to inspect the passive solar design features of the Armand Bayou Nature Center building, and to walk on the nature trails. Information about bringing school groups to the center and membership materials were distributed and discussed.

- University of Houston at Clear Lake City. UH-CLC provides funds for the instructors' salaries for the Energy Curriculum Institute from the funds generated by student enrollment formulas. Thus, while the instructors are teaching the institute their actual instructional salaries are paid by the university, not the Shell Foundation. Moreover, during the regular school year the instructors devote approximately 15% of their total time to the Energy Awareness Project. This time is "donated" to the project by the university.

Conclusion

While many teacher educators have agonized over the demise of federal support for curriculum development and teacher education, there are alternative approaches. This paper has described a model that stresses maximum cooperation and interaction with many types of energy and energy related organizations. We are convinced that the future belongs to those who are innovative and self reliant.

REFERENCES

John E. Steinbrink and Robert M. Jones, "Humanistic Learning Environments: The Development of a Local Energy Institute Model, Contemporary Education, Vol. 52, No. 2, Winter 1981, pp. 93-96.